

REMARKS

Claims 1-18 are pending in the present Application. Claims 10-18 are withdrawn, Claims 2, 3, and 5 have been canceled, Claims 1, 4, 7, and 9 have been amended, and Claims 19 and 20 have been added, leaving Claims 1, 4, 6-9, 19, and 20 for consideration upon entry of the present Amendment.

Objections to Claims

Claims 3, 5, and 7 are objected to for use of brackets in Chemical Formulas 1-5 in these claims, as the Examiner has indicated that the use of these brackets makes it unclear whether these formulas are being deleted. Applicants have accordingly amended Claim 7 to remove the brackets to clarify that the terms Chemical Formulas 4 and 5 are not being deleted. Similarly, while the limitations of Claims 3 and 5 have been included in Claim 1 as described below, and the claims deleted accordingly, and the limitations included in Claim 1 reflect the amendments to remove the brackets as in Claim 7.

Claim 9 is objected to for reciting the term “hybridizing”. Applicants have amended this term to be “hydrolyzing”, without prejudice and per the Examiner’s suggestion. Support for this amendment can be found in Claim 1 as noted by the Examiner. No new matter has been introduced by this amendment.

Accordingly, the Examiner’s objections should now be moot or addressed, and therefore Applicants respectfully request the Examiner reconsider and withdraw the rejection.

Amendments to Claims

Claim 1 has been amended to include the limitations of Claims 2, 3, and 5, canceled herewith, and to correct certain minor inadvertent typographical and grammatical errors.

Claim 4 has been amended to correctly depend from Claim 1, and to correct certain minor inadvertent typographical and grammatical errors.

Claims 7 and 9 have each been amended as discussed above to overcome the Examiner’s objections.

No new matter has been introduced by these amendments.

New Claims

Claims 19 and 20 have been included to further claim the invention. Support for these amendments can be found in the specification as filed. No new matter has been introduced by these new claims.

Reconsideration and allowance of the claims are respectfully requested in view of the above amendments and the following remarks.

Claim Rejections Under 35 U.S.C. § 112, Second Paragraph

Claims 1-9 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the Examiner alleges that it is unclear in Claim 1 whether the first mixture is selected from the three mentioned mixtures or whether all three mixtures are required.

Claim 1 has accordingly been amended without prejudice to recite “...one selected from the group consisting of...” elements a, b, c, and d, which is intended to convey that these four embodiments are alternative embodiments of the silane compound. As amended, Claim 1 therefore clearly recites these alternative embodiments, and thus show that the first mixture is selected from the mentioned mixtures. Accordingly, Claim 1 and its dependent claims should now be acceptable to the Examiner. Reconsideration and withdrawal of the rejection is respectfully requested.

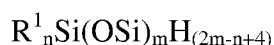
Claim Rejections Under 35 U.S.C. § 102(b)

Claims 1-9 stand rejected under 35 U.S.C. § 102(b), as allegedly anticipated by U.S. Patent No. 5,548,053 (“Weidner”) as evidenced by Salamone, “*Polymeric Materials Encyclopedia, Volume 7*,” p. 723 (provided by the Examiner). Applicants respectfully traverse this rejection.

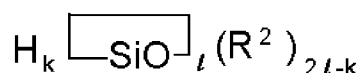
To anticipate a claim, a reference must disclose each and every element of the claim. *Lewmar Marine v. Variet Inc.*, 3 U.S.P.Q.2d 1766 (Fed. Cir. 1987).

Claim 1, as amended, claims a specific silane compound being selected from the group

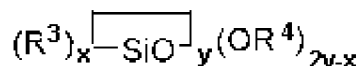
consisting of a) oxidized hydrosilane prepared by oxidizing hydrosilane oligomer represented by the following Chemical Formula 1 or cyclic hydrosilane oligomer represented by the following Chemical Formula 2, in the presence of water or alcohol, b) cyclic siloxane represented by the following Chemical Formula 3, c) a mixture of the oxidized hydrosilane and silane or silane oligomer, and d) a mixture of the cyclic siloxane and silane or silane oligomer;



Chemical Formula 1



Chemical Formula 2



Chemical Formula 3

Thus, in Claim 1 as amended, a) claims hydrosilane oligomer represented by the Chemical Formula 1 or cyclic hydrosilane oligomers represented by Chemical Formula 2; b) cyclic siloxane represented by the following Chemical Formula 3; c) a mixture of the oxidized hydrosilane of a) and silane or silane oligomer; and d) a mixture of the cyclic siloxane of b) and a silane or silane oligomer. Weidner does not disclose these compounds or combinations.

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, *in a single prior art reference.*” *Verdegaal Bros. V. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). Moreover, “[t]he identical invention must be shown in as complete detail as is contained in the *** claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). Missing elements may not be supplied by the knowledge of one skilled in the art or the disclosure of another reference. *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 780, 227 U.S.P.Q. 773, 777 (Fed. Cir. 1985). Weidner discloses an organosilicon compound of formula III, $(R^3)_a Si(OR^4)_{4-a}$, where R^3 is an organic radical. Col. 1, lines 58-67. Weidner does not disclose a hydrido substituent for formula III. Weidner also discloses an organo(poly)siloxane of formula silane of formula IV, $(R^5_2 SiO)_b$, where R^5 is an organic radical and b is 3 to 8 and may be cyclic. Col. 2, lines 1-12 and Col. 3,

lines 54-59. Weidner does not disclose that R^5 can be a hydrido substituent, and hence formula IV does not read upon Chemical Formula 2; likewise, Weidner does not disclose or exemplify that R^5 can be an alkoxy substituent, but exemplifies methyl groups (see Col. 3, lines 54-59), and hence formula IV does not read upon Chemical Formula 2.

Weidner fails to disclose the silane of Chemical Formula 1, the cyclic hydridosiloxanes of Chemical Formula 2, and also fails to disclose the cyclic alkoxyasilanes of Chemical Formula 3. Weidner therefore fails to teach all elements of each of the 4 embodiments a-d as claimed in Claim 1, and cannot anticipate these claims for at least this reason.

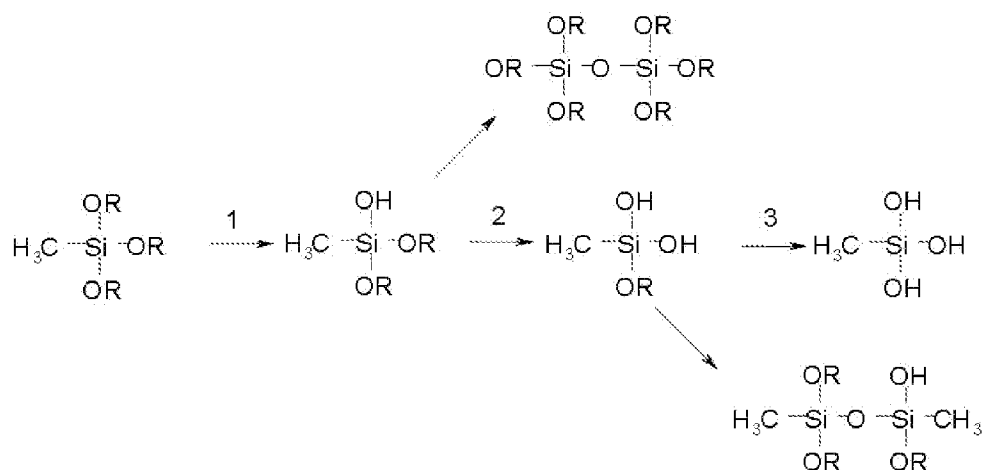
Claim 1 claims a method characterized by: i) mixing the specific silane compound with organic solvent to form a first mixture, and ii) hydrolyzing and condensing the first mixture by adding water and catalyst, and then to prepare an organic silicate polymer having superior mechanic property and low dielectric property.

Weidner disclose several silane compounds different from the specific silane compounds claimed in Claim 1, and hence fails to disclose the specific silane compounds and preparation method of an organic silicate polymer using the silane compounds.

Weidner does not disclose a hydrosilane (i.e., a silane having hydride substituents), but discloses only an alkoxyasilane having an alkoxy substituted end group, or a hydrolysate of the alkoxyasilane, which is not different from the specific hydrosilanes claimed in instant Claim 1. Moreover, even if an alkoxyasilane and its hydrolysate as disclosed in Weidner were hydrolyzed and condensed, the resulting product would not provide the specific oxidized hydrosilane or cyclic siloxane claimed in instant Claim 1.

Generally, hydrolyzing and condensing of alkoxyasilanes to prepare organic silicate polymers occurs simultaneously and is difficult to control and separate these two reaction steps (hydrolysis followed by condensation), as shown in the following Scheme 1, provided here to illustrate the differences between Weidner and the method of instant Claim 1.

Scheme 1



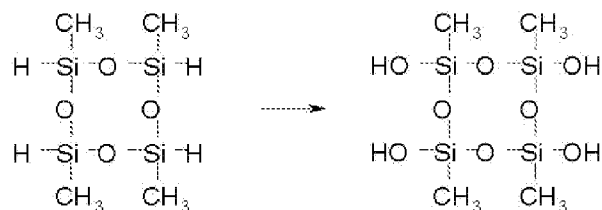
In Scheme 1, an alkoxydimethylsilane is condensed in advance of being fully hydrolyzed, so that it is difficult to prepare the fully hydrolyzed silane monomer 3, as seen in the above Scheme 1. Specifically, it would be excessively difficult to prepare the specific oxidized hydrosilane such as the fully hydrolyzed silane monomer 3 or cyclic siloxane as claimed in Claim 1, despite performing the hydrolyzation and condensation of alkoxydimethylsilane.

However, hydrosilanes or cyclic siloxanes as claimed in Claim 1 are oxidized to prepare the silane monomer, as recited in the following Schemes 2 and 3, which would provide a different hydrolyzed compound from that of an alkoxydimethylsilane.

Scheme 2



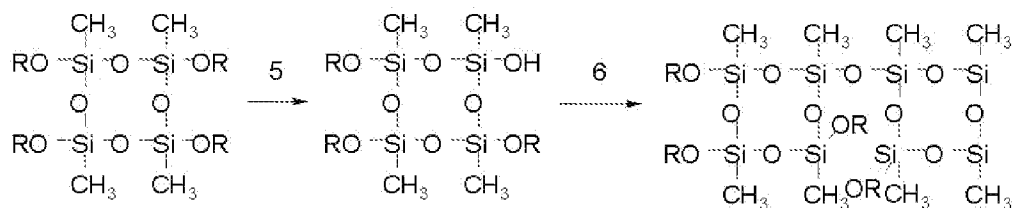
Scheme 3



Thus, by using the specific oxidized hydrosilane or cyclic siloxane selected from the group consisting of four mentioned a), b), c), and d), the present invention provides an organic

silicate polymer having a specific cyclic structure, which is different from the structure that would be obtained by using alkoxy silane, as seen in the following Scheme 4.

Scheme 4



In particular, an organic silicate polymer prepared from the specific oxidized hydrosilane or cyclic siloxane of a-d of instant Claim 1 has a more concrete structure, and shows a lower dielectric constant and superior mechanical properties (See Tables 1 and 2, Examples 1 to 6 and Comparative Examples 1 to 3 of the present application). These properties allow the use of the organic silicate polymer of the present invention in specific applications such as insulation films for semiconductor devices.

Methylsilsequioxane prepared according to Weidner is disclosed as useful, for example, as a foam stabilizer and as an additive to antifoams, toners, paints and other coating systems, e.g., paper coating compositions, fillers in plastics, or fillers in silicone rubber. Weidner, Col. 8, lines 20 to 30. However, Weidner fails to teach the use of an organic silicate polymer in a semiconductor device and the superior performance properties of the material prepared ultimately by the method of Claim 1, such as lower dielectric constant and improved mechanical properties. One skilled in the art will readily appreciate the vast differences in architecture of organic silicate prepolymers required for these different applications, based on the above exemplary schemes.

While Applicants understand that the Examiner has introduced Salomone as evidence that oxidation of hydrides may occur, there is no disclosure in Weidner as evidenced by Salomone that suggests or teaches the specific process of Claim 1 using the specific starting materials of embodiments a-d in Claim 1, and hence the Examiner has not met the burden of establishing anticipation of the instant Claim 1. Furthermore, were the Examiner to make a rejection on grounds of inherency, nothing in Weidner or Salomone indicates that the method

claimed in Claim 1 would be inherent to Weidner. The method of Claim 1 does not necessarily flow from the disclosure of Weidner, as the structure of the compounds of Weidner, formulas III and IV, are explicitly taught in Weidner and hydride groups or alkoxy groups cannot be present in the prior art where not specified in the first place. Finally, were a rejection made that was based on obviousness, the teachings of Weidner would not support a prima facie case of obviousness either, as there is nothing in Weidner (or Salomone) to teach or suggest the Applicants specific structural requirements to provide the desired properties of low dielectric constant and high mechanical strength, as discussed hereinabove.

Hence Weidner fails to teach or disclose all elements of the instant claims, and therefore cannot anticipate Claims 1-9. Reconsideration and withdrawal of the rejections are respectfully requested.

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance are requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

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Date: November 4, 2008